Wind Energy Study

The per capita conventional energy consumption in Tanzania is low compared with the per capita biomass energy consumption. It is anticipated that due to lack of affordable alternatives this trend is unlikely to change in the foreseeable future unless there are major changes in the energy sector. Among the highly anticipated scenario change is the shift to use of other renewable energy sources such as solar, wind, biogas and min/micro power, which are readily available in Tanzania.

Wind energy has been used in Tanzania for over 40 years mainly for water pumping. It is anticipated that there might exist some potential sites for wind turbine installations. In order to account for this, appropriate wind data are necessary, however wind data in Tanzania are not in the form that can cast light in that direction.

The Royal Danish Embassy realizing the need for such information requested TaTEDO to undertake a desk study for identifying potential sites for wind turbine pilot projects in Tanzania. The undertaken desk study involved consultation with different institutions, comprehending different wind energy data sources, extraction and processing of the available data into the form interpretable for possible use of wind energy for running wind turbines.

The result of the desk study indicate that there are 15 potential meteorological stations which promise possible wind turbine installations. Emanating from the desk study are drawn specific recommendations, which are:

One of the barriers to the installation of windmills for water pumping and wind turbines in Tanzania is the lack of reliable wind data. Prior to initiating wind energy project the local wind regimes should be well known. For this reason, recent and reliable wind data are a pre-requisite. Currently available and accessible wind data in Tanzania are old data collected between 1930's and 1970's. Although recent data are gathered by the Meteorological Department of Tanzania, these are unprocessed data. It is also not easily possible for third parties to get insight in the data (without paying for exorbitant amount of money).

Recommendation

§ **The Meteorological Department should make wind data readily available at affordable fees to persons and organizations interested in starting wind energy activities. It is suggested that the Ministry of Energy and Minerals intervenes, mediates and owns the data for developing its own wind energy data bank.**

This would be a first and easy way towards the penetration of wind energy usage in Tanzania, of course when considering installations for wind turbines, the reliability of data should be counterchecked by taking additional wind measurements on the specific site.

The reliability of the Meteorological Department's data if they were available are subject to accuracy doubt as they are obtained from equipment which are old. In addition the measurement are taken at best at heights of 10 meters.

Recommendation

§ **For reliable data on wind energy, modern equipment need to be available at pre-selected potential sites. In particular, for potential wind turbine installations, measuring equipment installed at heights above 10m are recommended.**

Another barrier with regard to availability of wind data for wind turbine installation is that not all regions in Tanzania are covered with at least one meteorological station with wind recording equipment situated 10 m and above. The team underscores the need for installation of wind measuring equipment at heights above 10 m at each regional meteorological station in the country.

Recommendation

§ **Wind measurements equipment placed at heights of 10 m should be should be established in Singida, Shinyanga and Rukwa Regions. When time and means are available these should be established at each district.**

Singida, Shinyanga and Rukwa regions are among the best located areas for wind mills installations. However, available information (from a recent visit to Singida - TCRS and Dodoma - CPPS water project)indicate that the wind measurements in these regions are those recorded from anemometers located at 1.8m. Data recording at above 10 m shall shed light on information on the potential for a possible wind turbine installations in these regions.

Recommendation

§ **Causes of possible malfunctioning of a high proportion of already installed wind mills in Tanzania should be established. Aspects of lack of maintenance, spare parts and infrastructure should be looked upon, so are cultural aspects.**

It is strongly recommended that for any potential site for wind energy project, technical, commercial and environmental constraints such as, accessibility (road), power needs, distance to consumption centers, land use restrictions, site ownership, ecological, noise, effect on local economy, and safety assessment are taken into account.

At the same time, cultural aspects to the wide application of the wind mills/turbine need to be overcome. These cultural aspects referred to are the attitudes and status symbols towards the introduced technology which are against or for the technologies. It has been cited for example that engine driven water pumps are often preferred than wind pumps because they are regarded as status symbols. Also the intermittent nature of water supplied from wind mills calls for storage tanks because people (Singida) preferred the readily available water supply from hand pumps than from the windmills.